



WRAP-UP PLENARY

Session 2

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**Long-Term Reliability of
Systems, Structures, and
Components (SSCs)**



General Observations - LTO

- No absolute barriers (“show stoppers”) were identified
- Some presentations based on prior plant experience
 - Others discussed limitations of extrapolation methods
- Potential challenges to optimum Long Term Operation (LTO)
 - Need to ensure systematic capture of operating experience for passive components (current and replacements)
 - Inspection capabilities, predictive diagnostics
 - Better understanding of analysis limitations in determining service life of equipment
 - Fatigue, environmental qualification



General Observations - LTO

- Lessons Learned
 - Systematic component replacement and LTAM (Long Term Asset Management) are important to maintaining long-term reliability
 - Design for inspection, diagnostics (sensors)
 - Better environmental protection (cable, buried piping)
 - Optimize replacement designs (corrosion resistant materials, size for uprates / improved plant operability)
 - Need LTAM planning for LTO



Suggested R&D Topics - LTO

- Research Challenges
 - Industry-wide passive-SSC operating experience database
 - Improved inspection, prediction methods (including limited accessibility)
 - Expanded utilization of information from retired SSCs
 - Development of “sentinel samples” for key knowledge needs
 - Proactively developed repair methods
 - Cables, buried pipe
 - “Silo elimination” - integration of technical contributors
 - Risk-informed role in LTO, approaches to address aging



Suggested R&D Topics - LTO

- Cross-cutting research
 - Experience from other industries
 - Digital I&C / IT implementation (aircraft, process plants, rail)
 - Not a LR-specific issue but important for LTO
 - Concrete degradation and inspection (hydraulic dams, storage tanks, roads)
 - Primary system approaches to remainder of plant
 - Material degradation matrix approach
 - Degradation prediction, projection methodologies
 - Fundamentals of degradation mechanisms



Topics for Further Discussion - LTO

- Suggested prioritized research pathways
 - Most critical issues
 - Optimize aging management programs for LTO
 - Digital I&C implementation to support LTO
 - Reactor internals LTO analysis
 - Containment issue scoping



Topics for Further Discussion - LTO

- Suggested prioritized research pathways
 - Potential longest time-frame/most difficult solutions to develop
 - Risk-informed prioritization (safety, economic)
 - Industry-wide passive SSC operating experience databases
 - Expanded use of retired SSCs / “sentinel” samples



Topics for Further Discussion - LTO

- Suggested prioritized research pathways
 - Other important issues
 - Proactive degradation mitigation and repairs
 - Cable
 - Piping
 - Concrete
 - Inspection
 - “Prognostics”
 - Robust, generic LTAM plans for LTO
 - Domestic and international collaboration